DS

7-58

FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

Blackwood

TO : Chief, Program Control Office, AP-PCO

DATE: JUL 17 1968

AP-RQA/Davis/867-2565

FROM : Acting Chief, Apollo Reliability & Quality Assurance Office, AP-RQA

SUBJECT: Staffing of APD#9A, Saturn Apollo Tank and Fluid Materials Testing Requirements

1. Attached is a copy of an APD#9A that was proposed by TS to update APD#9. This office agrees with the changes proposed by TS; however, it appears the office of primary responsibility within the Program Office should be either AP-SYS or AP-OPN. Please assess

2. It is requested that your office staff the proposed APD revision within the Program Office, and coordinate to obtain assignment of an office of primary responsibility.

3. It should be noted that TS does not plan any further implementation of this APD until revisions are made; therefore, expeditious action is necessary.

ORIGINAL SIGNED BY
JAMES L. JOYNER
J. L. Joyner

Enclosure: TS memo (w/2 atch) to AP dated May 13, 1968, subject: KSC APD #9 "Saturn/Apollo Tank and Fluid Materials Testing Requirements"

cc:
Adm. Middleton, AP
COPY TO ➡ Col. Scheller, AP-OPN
Mr. Beddingfield, AP-SCO
Mr. Wootton, AP-SYS

Per your request:

History – The APD #9 was generated by this office when it was a part of the old Saturn System Office. A.I's from OMSF concerning APD 23 (KSC APD #9) have been answered by this office in the past due to our familiarity with its generation.

However – I believe the office of prime responsibility should be AP-SYS due to their functional statement (KN 1142.21A) which says "Responsible for establishing performance requirements for KSC facilities; Establishes qualification testing guidelines and Center flight safety requirements. This office will gladly comment on the proposed APD if required. Bowman

UNITED STATES GOVERNMENT

Memorandum

TO : Apollo Program Manager, AP

DATE: MAY 13 1968

FROM : Director of Technical Support, TS

SUBJECT: KSC APD #9 "Saturn/Apollo Tank and Fluid Materials Testing Requirements"

1. A recent investigation by the Director, QA has prompted a detailed reconsideration of the subject APD.

2. KSC APD #9 apparently was issued in compliance with paragraph IV of OMSF APD #23 which required the Apollo Program Manager at KSC to implement APD #23.

3. The purpose of APD #23 is to insure that all fluids used with "Saturn/Apollo tanks" are compatible. The directive is applicable to all "Saturn/Apollo pressure vessels" in spacecraft modules, launch vehicle stages, their associated GSE and their test and launch facilities. However, some 17 titanium pressure vessels are singled out for initial implementation.

4. Although not stated, APD #23 was apparently intended to minimize the possibility of recurrence of the numerous compatibility problems encountered with titanium and other advanced state-of-the-art type pressure vessels associated with flight hardware. As such, the document is clearly justified.

5. KSC APD #9 tends to extend the applicability of the parent document by referring to "pressurized systems" rather than "tanks" or "pressure vessels," and by including references to "lines" etc. Moreover, deleting the reference to the 17 titanium vessels included in APD #23 removes the emphasis on state-of-the-art pressure vessels associated with flight hardware.

6. Based on our review of both documents, it appears that TS hardware which may be within the scope of the requirement is probably limited to gaseous hydrogen storage vessels operated at pressures in excess of 3,000 psi. However, under the present KSC organizational structure, this determination appears to clearly fall within the responsibility of the Design Engineering Directorate.

7. It is, therefore, requested that consideration be given to revising KSC APD #9 to more clearly reflect the intent of APD #23. Also, the revised APD should place the responsibility for determination of specific hardware testing and documentation requirements on DE with SO having responsibility for implementing those requirements. A suggested revision incorporating these changes is attached for your consideration.

Action
AP-SCO
AP-ROA

140-68

8. Comments on the suggested revision have been received from DE-MSD, copy enclosed. The second of the two comments has been included in the enclosed draft; the first has not.

9. No further attempts to implement KSC APD #9 will be undertaken pending receipt of your reply.

Raymond L. Clark

Enclosure: (1) Draft of Revision KSC APD #9
(2) Memo from DE-MSD to SO-QAL dated April 26, 1968, subject: KSC APD #9

KENNEDY SPACE CENTER
APOLLO PROGRAM DIRECTIVE DATE:

KSC APOLLO PROGRAM DIRECTIVE NO. 9A

TO: Distribution FROM: APOLLO PROGRAM MANAGER

SUBJECT: Saturn/Apollo Tank and Fluid Materials Testing Requirements

1. PURPOSE

The purpose of this Directive is to establish the requirements for tests and test procedures to ensure that all fluids (gasseous and liquid) are compatible with the Saturn and Apollo tanks and pressure vessels throughout the range of expected operating conditions of both the fluids and tank materials stated in the specifications.

2. SCOPE/APPLICABILITY

This Directive is applicable to all Saturn and Apollo pressure vessels and tanks in spacecraft modules, launch vehicle stages, their associated GSE and their test and launch facilities.

3. RESPONSIBILITY

A. The KSC Apollo Program Manager will assure that this program is effectively coordinated with other MSF Centers and within KSC.

B. The Director, Quality Assurance will be responsible (a) for reviewing program requirements and procedures to assure that they either conform with existing Center policy or identify the need for new Center policy, and (b) for monitoring the line organizations' operational reliability, quality assurance, and inspection functions to assure adherence to Center policy and procedures.

B. Such tests shall be sufficiently rigorous, both in statistical number and in scope, to assure compatibility over the specification range of both the fluid and the tank materials under normal expected operating conditions. In addition, when a tank is subjected to several different fluids during the process of manufacture, testing, flight and post-flight analysis, tests shall establish that combination of fluids which may be encountered through the life cycle are compatible with the material used and do not form reactions which are harmful to the system.

C. For each tank and pressure vessel falling within the requirements of 4 A. (2), above, a log shall be established and maintained. Such logs shall record the testing history and the fluid exposures. (For flight hardware, such logs become a part of the data package for the particular airborne hardware.)

UNITED STATES GOVERNMENT

Memorandum

TO : Chief, Quality Surveillance Office, SO-QAL

DATE: APR 2 0 1968

DE-MSD-3/541/Franks/8081

FROM : Chief, Mechanical Systems Division, DE-MSD

SUBJECT: KSC APD #9, "Saturn/Apollo Tank and Fluid Materials Testing Requirements"

Reference: (a) SO-QAL draft revision of KSC APD #9, and related draft memorandum, submitted for informal review 4/17/68
(b) OMSF APD #23 dated 12/6/66

1. We have reviewed your draft memorandum, TS to AP, reference (a), requesting revision of KSC APD #9 to reduce its scope to that of OMSF APD #23, reference (b). We concur with your rationale. The present scope of KSC APD #9 exceeds that of OMSF APD #23, and we concur that it should be reduced for economic reasons, unless the present scope is required for reasons unknown to us.

2. Our review of your draft revision of KSC APD #9, reference (a), indicates that it should be satisfactory, except as follows:

a. Part 3.C. should be revised to delete the reference to Director, Information Systems.

b. Part 4.A.(1). should be revised to read: "For pressure vessels of usually acceptable structural metals and alloys, with design safety factor of 3 to 1 or more, no special actions are necessary provided the fluids are compatible with accepted practice for these materials."

Albert Zeiler

Encl 2
4-26-68

C. The Director of Design Engineering and the Director, Information Systems shall be responsible for identifying all KSC designed or procured hardware falling within the scope of this directive, and for developing the testing requirements which must be fulfilled during the design and development phases together with the historical records which must be maintained not only during development, but also after turnover to the operating organizations.

D. The Director of Technical Support and the Director of Launch Operations shall be responsible for ensuring that the compatibility requirements for system hardware and fluids, established by the design directorates, or NASA design centers are maintained while the hardware is under their operational control.

4. PROCEDURES

A. Prior to the initial use of any processing, cleaning, testing or operating, fluid in a storage tank, propellant tank or any other pressure vessel, the compatibility of the fluid and tank material shall be clearly established.

(1) For pressure vessels of usually acceptable structural metals and alloys, with design safety factors of 3 to 1 or more, no special actions are necessary provided the fluids are compatible with accepted practice for these materials.

(2) For pressure vessels and tanks designed to operate at higher stress ratios or with special materials applications which are extending the "state-of-the-art" of structural design and reliability, the compatibility of the pressure vessel materials with the fluids may be established through a review of the literature, a material compatibility testing program, or a combination of both.